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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,885	12/10/2003	Ashfaqu I. Chowdhury	LD 11255 GECZ 2 00404	6941

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EXAMINER

ROY, SIKHA

ART UNIT	PAPER NUMBER
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2879

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/732,885	CHOWDHURY ET AL.	
	Examiner	Art Unit	
	Sikha Roy	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 26 and 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/2/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I claims 1-25 in the reply filed on June 22, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 26,27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Group II, there being no allowable generic or linking claim.

Claim Objections

Claim 19 objected to because of the following informalities:

In claim 19 line 3 'about 20' should be replaced with -- about 20°--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3,4,9-12,14,15,20,21 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 3 the claim does not recite any particular method followed for reflecting UV radiation such that 45% of the UV emitted reaches the metal halide pool

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and hence renders the claim indefinite. The Examiner notes that the reflection of UV radiation so that it reaches the metal halide pool depends upon a number of parameters such as the shape of the vessel, the pattern and area of the deposition of the coating and thickness of the material of the coating. For continuing examination only the location of the deposited coating which reflects UV radiation is considered.

Claim 4 does not recite any parameters or method for optimizing the coating so that it has greatest reflectivity in the region of UV spectrum where UV emission is greatest and thus renders the claim indefinite. For continuing examination only the location of the deposited coating which reflects UV radiation is considered.

Claims 9,10,14, 15 and 20,21 do not recite how the coating is optimized (whether changing the coating material or the thickness of the materials of the coating or area of deposition of the coating) so that reflection of UV emission is within about 10 degree of the mean angle and thus render the claims indefinite.

Claim 11 does not recite any limitation or provide any parameter or method for optimizing the coating to reflect UV light at each of the plurality of wavelengths in direct proportion to the spectral power and thus renders the claim indefinite.

Claim 12 is rejected because of its dependency status from claim 11.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,552,671 to Parham et al.

Regarding claims 1 and 2 Parham discloses (column 3 lines 42-62, column 4 lines 37-45) a method of improving the efficacy of a quartz metal halide lamp comprises operating the lamp causing UV emission from an arc, and disposing a multi-layer coating on the surface of the arc tube the coating comprising layers of at least two materials of different refractive index which in combination reflect UV radiation in the 300-400 nm range which causes further vaporization of liquid metal halide dose within the arc tube. The coating comprising silica in combination with tantala or titania contributes to the reflective quality and varying the combination of materials, preferred UV reflecting configuration can be chosen. Parham further discloses (column 4 lines 1-9) the multi-layer coating blocks 99% UV radiation and hence it is inherent that the coating is optimized to reflect 99% UV radiation striking the coating. Fig. 4 of Parham discloses the transmittance of UV radiation in 280-380 nm is blocked by the multilayer coating on the surface of the arc tube.

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Regarding claim 6 and 7 Parham discloses (column 5 lines 9-16) the method comprises the multilayer coating reflecting a portion of light having wavelength 400nm back into the lamp.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,552,671 to Parham et al. and further in view of U.S. Patent 5,059,865 to Bergman.

Regarding claim 3 Parham does not explicitly disclose the limitation of at least 45% of the UV emitted by the arc tube reflected by the coating reaches the metal halide pool.

Bergman in same field of endeavor discloses (column 4 lines 13-24) a metal halide lamp in which infrared reflective coating has the benefit of increasing the vaporization and ionization of the mercury inside the lamp and thus enhancing the efficacy of the lamp.

In the instant application UV radiation, is used for heating the metal halide pool in the lamp. Therefore it would be obvious to one of ordinary skill in the art at the time of invention to select the ultraviolet reflecting coating of Parham such that most of the

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ultraviolet radiation emitted between 300-400 nm reaches the mercury pool for vaporizing and ionizing the mercury as suggested by Bergman (in case of infrared radiation) and thus enhancing the efficacy of the lamp.

It is noted that the more UV radiation reflected by the coating reaches the metal halide pool, more vaporization of the metal halide takes place and thus the lamp performance is enhanced. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to specify that at least 45% of the reflected UV radiation reaches the metal halide pool of the lamp of Parham, since discovering an optimum value of a result variable is considered within the skills of the art.

Regarding claim 4 it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the reflectivity of the coating at a position where the UV emission from the arc tube is greatest which would provide maximum reflected UV radiation and hence enhance performance of the lamp.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,552,671 to Parham et al. and further in view of U.S. Patent 5,214,345 to Saito et al.

Regarding claim 5 Parham is silent about determining the spectral distribution of the lamp when un-coated and then optimizing the coating to provide greater reflectivity of emitted UV radiation.

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Saito in analogous art of ultraviolet shielding in a halogen arc lamp discloses (column 5 lines 34-63) using a non-coated lamp and finding relationship between the wavelength and relative intensity of emission of irradiated rays and using the data (Table 1) to find the region of emission of ultraviolet radiation. Saito further teaches thus coating on the lamp can be provided to shield UV radiation only and transmit the visible rays.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to determine the spectral distribution for an uncoated lamp of Parham, finding the region of greatest UV emission and then providing the coating for optimizing the reflection of UV radiation from the lamp as taught by Saito.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,552,671 to Parham et al. and further in view of U.S. Patent 5,646,472 to Horikoshi.

Parham is silent about improving the efficiency of the lamp by determining spectral power distribution and then applying multilayer coating optimized to reflect UV light at each of the plurality of the wavelengths proportional to the spectral power.

Horikoshi in same field of endeavor discloses (column 3 lines 1-20) determining spectral power distribution of a metal halide lamp and then applying selective multilayer optical interference coating so that there is minimum light transmittance of 80% or lower in the wavelength range of 350-500 nm and light transmittance of 70% or higher including essentially 90% or higher in the wavelength range of 600-900nm. Horikoshi

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further discloses, spectral transmittance characteristics for different wavelengths can be changed by changing the constituent of the multilayer coating.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to determine the spectral power distribution of the metal halide lamp emitting UV and select the UV reflecting coating of Parham as suggested by Horikoshi for optimizing reflection of UV radiation according to different wavelengths.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,552,671 to Parham et al., U.S. Patent 5,646,472 to Horikoshi and further in view of U.S. Patent 5,059,865 to Bergman.

Regarding claim 12 Parham and Horikoshi do not explicitly disclose the limitation of at least 45% of the UV emitted by the arc tube reflected by the coating reaches the metal halide pool.

Bergman in same field of endeavor discloses (column 4 lines 13-24) a metal halide lamp in which infrared reflective coating has the benefit of increasing the vaporization and ionization of the mercury inside the lamp and thus enhancing the efficacy of the lamp.

In the instant application UV radiation, is used for heating the metal halide pool in the lamp. Therefore it would be obvious to one of ordinary skill in the art at the time of invention to select the ultraviolet reflecting coating of Parham and Horikoshi such that most of the ultraviolet radiation emitted between 300-400 nm reaches the mercury pool for vaporizing and ionizing the mercury as suggested by Bergman (in case of infrared radiation) and thus enhancing the efficacy of the lamp.

It is noted that the more UV radiation reflected by the coating reaches the metal halide pool, more vaporization of the metal halide takes place and thus the lamp performance is enhanced. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to specify that at least 45% of the reflected UV radiation reaches the metal halide pool of the lamp of Parham, since discovering an optimum value of a result variable is considered within the skills of the art.

Claims 8, 13, 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,552,671 to Parham et al. and further in view of U.S. Patent 5,017,839 to Arlt et al.

Regarding claim 8 Parham is silent about optimizing the multilayer coating at an angle selected to take into account the off-normal incidence of the radiation on the arc tube.

Arlt in same field of endeavor discloses (Fig.1 column 3 lines 30-41) a metal halide discharge lamp which has the coating 8 selected to take into account of the off-normal incidence of radiation and the angle formed by the coating is selected so that predetermined areas of the lamp are heated by the radiation reflected by the coating. This provides the benefit of reflection of radiation at the two end areas of the lamp and rapid starting of the lamp.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to take into account of off-normal incidence of the UV radiation on the arc tube of Parham and select the thickness and angle of deposition of the multilayer coating as taught by Arlt for providing maximum reflection of the emitted UV radiation.

Regarding claim 13 Parham in view of Arlt disclose the step of improving the efficacy of a metal halide lamp comprising operating the lamp causing UV emission from an arc, and disposing a multi-layer coating on the surface of the arc tube the coating comprising layers of at least two materials of different refractive index which in combination reflect UV radiation in the 300-400 nm range which causes further vaporization of liquid metal halide dose within the arc tube. The coating comprising silica in combination with tantala or titania contributes to the reflective quality and varying the combination of materials, preferred UV reflecting configuration can be chosen. The multilayer coating is optimized at an angle taking account of off-angle incidence of the emitted UV radiation as suggested by Arlt.

Regarding claims 16 and 17 Parham and Arlt disclose the claimed invention except for the limitation of angle being less than 35 degree (claim 16) and between 10 and 35 degrees (claim 17). It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide values of

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the off-normal incidence angle less than 35° and between 10° and 35° , since optimization of workable ranges is considered within the skill of the art.

Regarding claims 18 and 19 Parham and Arlt disclose the lamp having cylindrical shape but do not explicitly disclose it being vertically aligned.

The examiner notes that it is well known in the art that metal halide lamp operates both in horizontal and vertical alignments and hence it would be obvious to one of ordinary skill in the art at the time of invention to modify the coating of the lamp of Parham and Arlt for optimizing the off-normal incidence of UV radiation for vertically aligned metal halide lamp of cylindrical shape of Parham and Arlt so that angle lies between 15° and 30° .

Claim 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,552,671 to Parham et al., U.S. Patent 5,017,839 to Arlt et al. and further in view of U.S. Patent 5,138,219 to Krisl et al.

Regarding claim 22 Parham and Arlt do not teach using computer program for calculating thickness of each layers and optimum number of layers of the multilayer coating for optimizing the coating at an angle.

Krisl in pertinent art discloses (column 7 lines 64 through column 8 line 15) using computer optimized programs resulting in optimum thickness and the number of layers in a multilayer optical interference coating for transmitting visible spectrum of at least about 90% between 400-700 nm and a reflectance of 70% of infra red spectrum. It is noted that computer programs provide simple optimization method for handling a large

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number of data relating thickness, refractive indices of various materials in a multi-stack arrangement of different layers.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize computer program to optimize the coating of the lamp of Parham and Arlt as taught by Krisl for providing simple optimization method for handling a large number of data relating thickness, refractive indices of various materials in a multi-stack arrangement of different layers.

Regarding claim 23 Parham discloses (column 4 line 63 through column 5 line 15) preferred combination of silica and tantala or titania contributes to the reflective quality of the coating, tantala and titania contribute to mainly UV absorption and silica to UV reflection. Therefore it would have been obvious to one of ordinary skill in the art to apply greater weighting of silica component in the optimized multilayer coating for providing high reflectivity in the regions where spectral power is high.

Regarding claim 24 Parham discloses (claims 19, 28) coating is provided such that 90% of UV emission between 300 and 400 nm is reflected.

Regarding claim 25 Parham and Arlt disclose the claimed invention except for the limitation of optimizing the coating for 95% reflection of UV between 300 and 370 nm. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to optimize the coating of Parham and Arlt for 95% reflection of UV between 300

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and 370nm, since discovering an optimum value of a result variable is considered within the skills of the art.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 5,540,978 to Schrenk discloses all-polymeric ultraviolet reflecting light film. U.S. Patent 5,587,626 to Parham et al., U.S. Patent 5,952,768 to Strok et al., and U.S. Patent 6,967,443 to Bigio et al. disclose metal halide arc tube with patterned reflecting coating.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sikha Roy

Sikha Roy
Patent Examiner
Art Unit 2879